Gynodioecy in Mammillaria dioica (Cactaceae).—Virtually every flora and monograph treating *Mammillaria dioica* K. Brandegee describes the species as incompletely or partially dioecious. In her description of the species Brandegee stated that many plants were either male or female, and others hermaphroditic or "imperfectly dioecious in all degrees" (Erythea 5:115–116. 1897). Our observations of plants in Anza Borrego Desert State Park in SE San Diego Co., CA in 1968 and 1978 indicate that populations of *M. dioica* in this area are in fact gynodioecious, the plants being either hermaphroditic or pistillate. Both hermaphrodites and pistillate plants set fruit with apparently normal seed. Compared with hermaphrodites, the flowers of pistillate plants are smaller, with narrower petals, but larger stigmas (Fig. 1.). The pistillate flowers bear stamens with indehiscent anthers that contain no pollen. Self-incompatibility, self-compatibility, autogamy, cleistogamy, and agamospermy are known in the Cactaceae (Ganders, Cact. Succ. J. Gt. Brit. 38:39–40. 1976), but *M. dioica* is apparently the only species in the family with imperfect flowers. Brandegee's description was based only on plants from near the coast, so

Fig. 1. Pistillate (left) and hermaphroditic flowers of *Mammillaria dioica* (scale in mm).

it is uncertain whether the breeding system of the species differs in coastal and inland populations, or whether she misinterpreted the situation. The distribution of floral forms in this species merits more extensive observation by botanists in the San Diego region.—Fred R. Ganders and Helen Kennedy, Department of Botany, University of British Columbia, Vancouver, B.C., Canada V6T 1W5.

Additions to the Flora of the Farallon Islands, California. — The flora of the Farallon Islands, San Francisco County, California, was recently described by Coulter (Coulter, Madroño 21:131–137. 1971) based on observations made in 1968. Since 1968, I have noted 14 additions, eight previously unreported and six previously reported species, possibly missed in 1968. A new variety of a previously noted species has also been observed. I have not noted any extinctions. I report here on the additional species noted from 1968 through the summer of 1975.

Before the 1968 flora only two papers had been published on the plants of the islands. Blankenship, who was on the islands 3–6 July 1892, collected 28 species, 11

native and 17 introduced plants (Blankenship and Keeler, Zoë 3:144–165. 1892). Ornduff, who was there for a short time in May 1960, found only 20 species, 10 native and 10 introduced, but noted the addition of 3 new ones to the islands (Ornduff, Leafl. West. Bot. 9:139–142. 1961). For the 1968 flora, I was present on the islands for three months during the spring and summer of 1968 and found 36 species, 14 previously unnoted. Of the 36 species, 13 were native and 23 were introduced. With the 14 additions noted here, the island list contains 50 species, 18 native and 32 introduced.

Following is a list of the additional species. Previous listings of species by Blankenship and Ornduff are noted. For a description and map of the islands, see the 1968 flora (Coulter, Madroño 21:131–137. 1971). Names are given according to Munz (Munz, A California flora. Univ. of Calif. Press, Berkeley, 1959) and where they have been changed Munz's names are in synonomy. Names with asterisks are those of introduced species. Specimens have been placed in the Dudley Herbarium (DS) except as noted.

**Anagallis arvensis* L. f. *caerulea* (Schreb.) Baumg. Although this taxon was reported by Blankenship, Ornduff, and Coulter, the population consists almost exclusively of the pin-orange variety. A few plants of the blue variety were found near East Landing about 2 m south of the tram tracks in 1971. They have not been found in subsequent years.

Bromus cf. *maritima* Hitchc. Previously unreported, this grass was found in 1975 in a few patches 15 to 30 south of the lighthouse on Lighthouse Hill. It has not been collected; a photograph of the plant was identified by B. Crampton.

**Cerastium viscosum* L. This is likely the *C. glomeratum* Thuill. of Blankenship. It has not been reported since 1892. In 1975 a few plants were found by B. Lewis along the sidewalk northeast of Heligoland Hill. It has not been collected.

**Gnapalium luteo-album* L. A new species on the islands, in 1975 a few plants were found along the tram tracks by B. Lewis.

Juncus bufonius L. Jim Lewis (PRBO) found viable seeds in the damp area between the living quarters and the paint locker in 1975. Plants grown from these seeds were collected and identified. The species was reported by Blankenship and Ornduff but missed by Coulter in 1968.

**Leontodon leysseri* (Wallr.) G. Beck. Observed in 1972, this plant is new to the islands. It grows along the tram tracks between East Landing and the Power House.

**Malva parviflora* L. In 1974 many plants were found by R. Boekelheide around the living quarters and from the living quarters to the water. This plant was reported by Blankenship but not listed by Ornduff or by Coulter in 1968.

**Medicago hispida* Gaertn. In 1975 scattered plants were found in the southeast section of the island. Perhaps this is *M. denticulata* Willd. recorded by Blankenship. It has not been collected.

Montia hallii (Gray) Greene. Found in 1972 but not observed earlier, this plant grows along the path near the top of Lighthouse Hill.

**Plantago coronopus* L. A new plant to the island, many plaintains were found along the south slope of Lighthouse Hill near the living quarters and between the living quarters and the Power House.

**Polycarpon tetraphyllum* (L.) L. Found on the island for the first time in 1972, this plant grows commonly along the tram tracks near the living quarters.

Psilocarphus tenellus Nutt. var. *tenellus*. Listed by both Blankenship and Ornduff but missed in 1968, this plant grows commonly where the soil is hard and gravelly in the southeast part of the island.

**Rumex crispus* L. One plant was found among the gull colony in the southeast part of the islands in 1974. It bore fruit in that year and again in 1975. This plant has not been found on the islands before.

Sagina occidentalis Wats. This plant grows commonly in the southeast part of the

island where the soil is hard and gravelly. It was noted by Blankenship and Ornduff but missed in 1968.

**Vulpia myuros* (L.) K. C. Gmelin var. *hirsuta* Hack. (*Festuca megalura* Nutt.) In 1975 many patches of this grass were found near the lighthouse on Lighthouse Hill. This is a new species to the islands.

Some species such as *Psilocarphus tenellus* and *Sagina occidentalis,* reported by both Blankenship and Ornduff, were probably present but overlooked in 1968. *Cerastium viscosum, Malva parviflora* and *Medicago hispida* were recorded by Blankenship but not by Ornduff or by Coulter in 1968. In 1892 these plants may have persisted in fenced gardens, protected from rabbit grazing, as suggested by Ornduff. The gardens have since been abandoned. Between 1972 and 1975 the Point Reyes Bird Observatory carried on a program to eliminate the rabbits, which were finally completely eliminated in 1975. With the reduction in the rabbit population these plants may have been able to recolonize the islands; or, perhaps, these species persisted as repressed populations, expanding with the reduction in rabbit numbers.

The location where some new species were first recorded suggests the ways in which these plants came to the islands. *Anagallis arvensis* forma *caerulea, Leontodon leysseri,* and *Polycarpon tetraphyllum,* found along the tram tracks where there is much human activity were likely brought by man. *Bromus maritima, Montia hallii,* and *Vulpia myuros* were found near the top of Lighthouse Hill where most migrant passerine birds first land on the islands. These plants may have been transported by passerines. Finally, *Rumex crispus,* found in the gull colony, may have been brought by gulls, which fly between the islands and the mainland.

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This is contribution number 151 of the Point Reyes Bird Observatory. — Malcolm Ç. Coulter, Department of Biology, University of Pennsylvania, Philadelphia 19104.

REVIEW

Manual of the vascular plants of Wyoming. By Robert D. Dorn. Illustrations by Jane L. Dorn. 2 vols. 1498 pp. 1977. Garland Publ. Co., New York. ISBN 0-8240-9905-2. $95.

Wyoming now has a flora! A conspicuous blank spot has been filled in for plant taxonomists, biogeographers, ecologists, resource managers, users of Wyoming's natural resources, and those who appreciate and have the opportunity to enjoy its rich natural beauty.

Many of Wyoming's political leaders and residents are salivatingly eager to exploit its coal, oil, forests, rangelands, wildlife, water soils, scenery, and other operationally non-renewable natural resources. Others wish to apply a conservation ethic, or legal restrictions, to unregulated use. Both groups have had a most useful tool handed to them free, more or less, by an independent, dedicated, skillful scientist.

The manual is excellent. Dorn is a practiced, perceptive, industrious plant collector. He mentions giving himself only three years to do the flora. Thus, some weeds and all infraspecific taxa are not included, distributions are given only within Wyoming and in broad categories, habitat information is minimal. 2144 species are well described. Leading families are *Compositae* (with 17.3% of the species), *Gramineae*